

A NEW SPECIES OF THE GENUS *SLADENIA* (PISCES, LOPHIIDAE) FROM THE EAST CHINA SEA AND THE SOUTH CHINA SEA

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Abstract A new lophiid anglerfish of the deep water genus *Sladenia* is described based on four specimens collected from the East China Sea and the South China Sea during the period from 1980 to 1982.

Sladenia Regan (1908) is a genus of lophiid anglerfish with rounded rather than depressed head, and compressed rather than depressed tail; nasal sacs not constricted at the base; very long pseudobranchia; humeral, subopercular, quadrate, parietal and articular spines absent; epiotic and interopercular spines low and rounded; vomerine teeth larger than palatine teeth; illicial bone and second dorsal spine inserting very close together on illicial pterygiophore; third or third and fourth dorsal spines invisible, hiding under the skin of post-cephalic portion; and smooth ridge on frontal bones anterior to eyes and lateral to illicial pterygiophore.

There were only four specimens, identified as 3 species, i. e., *S. gardineri* Regan, 1908, *S. remiger* Smith et Radcliffe, 1912 and *S. shaeferi* Caruso et Bullis 1976, belonging to the genus *Sladenia* in the world before 1976. During the period from 1980 to 1982, the RV “Dongfang” and the RV “Nanfeng” of the East China Sea Fisheries Institute and the South China Sea Fisheries Research Institute respectively, completed a survey of the deep water fish fauna of the East and South China Seas. Four separate Chinese specimens of the rare lophiid anglerfish genus *Sladenia* were collected. With detailed analysis of the four rare specimens, it was recognized that they should belong to the same species, and also a new species named as *Sladenia zhui*.

***Sladenia zhui* sp. nov.** (Figs 1–3)

Materials and methods. Terminology used in describing the angling apparatus follows Bradbury (1967) and Caruso (1981); counting and measurements follow Caruso and Bullis (1976). Table 1 shows the collecting information and depositing sites of 4 specimens of *Sladenia zhui* sp. nov.

Synonym. *Sladenia remiger*, Ni (nec Smith et Radcliffe, 1912), 1988: 317–318, fig. 250, two female specimens, 500–525 mm SL, East China Sea,

depth 979 m.

Sladenia gardineri, Su (nec Regan, 1908), 2002: 351–352, fig. 163, four specimens, 210–525 mm SL, deep waters of the East China Sea and the South China Sea.

Counts and measurements. D. IV-9-10; A. 6-7; P. 18-19; V. I-5; C. 8 (outer two elements unbranched, other branched). Measurements in percentage of standard length (SL): head length (HL) 37.9–41.5, head width (HW) 20.0–25.6, head depth (HD) 30.7–35.7; snout length (SNL) 17.1–19.7, snout width (SNW) 11.7–13.1, length of illicial bone (1st dorsal spine) 35–41, length of 2nd dorsal spine 10.6–20.2. Measurements in percentage of head length (HL): head width (HW) 50.0–64.3, snout length (SNL) 44.0–49.2, snout width (SNW) 29.2–34.6 (Tables 2 and 3).

Description. Head rounded, body compressed; cranial spines sturdy and blunt, frontal and sphenotic bones are slightly produced; pronounced muscular hump immediately behind head; illicial bone longer (35%–41% of SL) and slender, second dorsal spine also slender, approximately 1/3–1/2 length of illicial bone; the fifth and sixth dorsal spines absent, the third and fourth present but contained in loose fold of skin; skin bearing numerous small, lanceolate cirri arranged in irregular rows and patches on head, lower jaw and caudal peduncle, but confined generally to region of lateral line on body; color pattern in formalin uniform brown, the terminals of all fins are blackish; inside of mouth dusky; peritoneum black; teeth typically cardiform but proportionally smaller than those of other lophiids.

Diagnosis. *Sladenia zhui* is distinguished from other members of its genus by having a much wider snout (11.7%–13.1% of SL; 29.2%–34.6% of HL); by the presence of four dorsal spines, the first and second close to the tip of snout, the third and fourth completely contained within loose fold of skin which connects these two spines to the soft dorsal fin; by the blunt, sturdy cranial spines; and by having a uniform

brown coloration, lacking vermiculations or contrasting pigment.

Discussion. The four Chinese specimens were identified as *S. remiger* Smith *et* Radcliffe by Ni (1988) and *S. gardineri* Regan by Su (2002). In fact, the four specimens have significant differences from the above two species (for detail, refer to the following key). Therefore, we thought it should be a new species in 2000 and posted the manuscript with figures of the specimens to Dr. J. H. Caruso of Tulane University, USA, a specialist in deep sea lophiid anglerfish. He also agreed it should be a new species. The four species of the *Sladenia* can be distinguished by the following key.

Etymology. We take pleasure in naming this species in honor of Prof. ZHU Yuan-Ding (CHU Yuan-Ting), the former president of the Shanghai Ocean University and director of the East China Sea Fisheries Research Institute, in recognition of his outstanding contributions to fisheries education and science, especially to ichthyology of China.

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Key words *Sladenia*, new species, the East and South China Seas.

宽鳃鮫属一新种

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摘要 20世纪70年代以前,全世界已知宽鳃鮫属 *Sladenia* Regan (1908) 鱼类仅有3种。1980~1982年期间,东海水产研究所“东方”号和南海水产研究所“南锋”号调查船分别在东海和南海的大陆架渔场调查时,共采集到4尾珍稀的深海鮫鱼类。经研究,认为这4尾标本是1新种,定名为朱氏宽鳃鮫 *Sladenia zhui* sp. nov.。

关键词 宽鳃鮫属, 新种, 东海, 南海。

中图分类号 Q959.491

宽鳃鮫属 *Sladenia* Regan, 1908 是鮫科 Lophiidae 中的深海种类, 栖息水深在 600~1300 m 左右, 分布于太平洋、印度洋和大西洋。其主要特征是: 头大而圆, 略平扁, 尾部稍侧扁。鼻囊在基部较大, 两鼻孔开口于鼻囊的前端和后端。鳃孔宽大, 部分在胸鳍下方, 部分在胸鳍前方或上方; 假鳃很长。背鳍具 3~4 棘, 第 1 背鳍棘 (诱竿) 和第 2 背

Key to the world species of the genus *Sladenia* Regan, 1908.

- 1 (4) Post-cephalic portion of spinous dorsal fin consisting of one embedded spine and hiding under the skin
- 2 (3) Having a intermediate head length (32.7 % - 34.8 % of SL); moderate snout length (47.5 % - 57.1 % of HL); one post-cephalic dorsal spine completely embedded in subcutaneous tissue and not contained in loose fold of skin; low, rounded cranial spine; a color pattern consisting of relatively coarse, irregular, light vermiculations over a brown background covering the dorsal and lateral surface of the head and body, and dorsal, anal, caudal and pectoral fins (two specimens, 146.2 - 397.0 mm SL; Western Atlantic Ocean; Caribbean Sea, depth 850 - 1200 m) *S. shaeferi* Caruso *et* Bulli, 1976
- 3 (2) Having a shorter head (27.6 % of SL); longer snout length (74.1 % of HL); one post-cephalic dorsal spine almost completely contained within loose fold of skin which connects it to the soft dorsal; well developed cranial spine, with the frontal and sphenotic spine enlarged, the former greatly; and a uniform pale gray coloration, lacking vermiculations or other contrasting pigment (single specimen, 92.3 mm SL; South-Western Pacific Ocean; Gulf of Tomini, Celebes, depth 1294 m) *S. remiger* Smith *et* Radcliffe, 1912
- 4 (1) Post-cephalic portion of spinous dorsal fin consisting of two spines contained in a loose fold of skin, and connects it to the soft dorsal
- 5 (6) Having a narrower snout (8.8 % of SL, 21.3 % HL); low, sharply pointed cranial spines; and a color pattern of relatively fine, irregular, pale vermiculations on a darker background (single specimen, 351 mm SL, Indian Ocean, Chagos Archipelago, Solomon Island, depth 900 m) *S. gardineri* Regan, 1908
- 6 (5) Having a much wider snout (11.7 % - 13.1 % of SL, 29.2 % - 34.6 % of HL); blunt sturdy cranial spines; and a uniform brown coloration, without vermiculations or other contrasting pigment (four specimens, 210 - 525 mm SL, Western Pacific Ocean; the East China Sea and the South China Sea, depth 655 - 979 m) *S. zhui* sp. nov.

鳍棘紧靠, 位于担鳍骨上; 第 3 或第 3、4 背鳍棘在后头部不外露。无肩棘、下颔盖骨棘、方骨棘、顶骨棘和关节骨棘; 上耳骨棘和间颔骨棘低而圆。眼前和诱竿担鳍骨两侧的额骨嵴光滑。犁骨齿大于髁骨齿。

本属鱼类种类和数量少, 20 世纪 70 年代以前, 全世界已知宽鳃鮫属 *Sladenia* Regan (1908) 鱼类

仅有 3 种共 4 尾标本: *S. gardineri* Regan, 1908 (1 尾); *S. remiger* Smith et Radcliffe, 1912 (1 尾) 和 *S. shaeferi* Caruso et Bullis, 1976 (2 尾)。1980 ~ 1982 年期间, 东海水产研究所“东方”号和南海水产研究所“南锋”号调查船在东海和南海的大陆架渔场调查时, 共采集到 4 尾珍稀的深海鮫鰩鱼类。经深入研究, 这 4 尾中国标本被认为是 1 新种, 命名为朱氏宽鳃鮫鰩 *Sladenia zhui* sp. nov., 报告如下。

表 1 朱氏宽鳃鮫鰩 4 尾标本的采集信息和保存地点
Table 1. Collecting information and depositing sites for four specimens of *Sladenia zhui* sp. nov.

编号 No.	体长 SL (mm)	日期 Date	采集位置 Collected locality	调查船 RV	水深 Depth (m)	存放单位 Deposited locality
正模 E-0709 Holotype	500	1981-06-10 10 June 1981	28°09'N, 126°58'E 28°14'N, 127°01'E	“东方”号 “Dongfang”	979	东海水产研究所 EFRI
副模 E-0708 Paratype	525	1981-06-10 10 June 1981	28°09'N, 126°58'E 28°14'N, 127°01'E	“东方”号 “Dongfang”	979	东海水产研究所 EFRI
副模 D-1537 Paratype	300	1982-04-20 20 Apr. 1982	18°38'N, 112°39'E 18°42'N, 112°44'E	“南锋”号 “Nanfeng”	655 ~ 684	南海水产研究所 SFRI
副模 D-2381 Paratype	210	1980-10-07 7 Oct. 1980	19°N, 113°38'E 19°03' N, 113°43' E	“南锋”号 “Nanfeng”	809 ~ 840	南海水产研究所 SFRI

1.2 方法

标本测量和计数方法参照 Bradbury (1967) 和 Caruso (1981): 头长 (HL) 指前颌骨缝合处至头颅后部中央末端之距; 头宽 (HW) 指两翼耳骨棘之间距; 头高 (HD) 指翼耳骨棘与下方骨棘之间距; 吻长 (SNL) 指前颌骨缝合处与后颌骨棘之间距; 吻宽 (SNW) 指颌骨与侧筛骨连接处的颌骨之距, 即两腭骨棘正后方的颌骨之距。全长 (TL) 和体长 (SL) 按常规方法测量。

2 新种描述

朱氏宽鳃鮫鰩, 新种 *Sladenia zhui* sp. nov. (图 1 ~ 3)

2.1 异名

褐色宽鳃鮫鰩 *Sladenia remiger* 倪勇 (nec Smith et Radcliffe, 1912), 1988: 317 ~ 318, 图 250 (东海深海, 2 尾雌体, 体长 500 ~ 525 mm, 水深 979 m)。

加氏高体鮫鰩 *Sladenia gardineri* 苏锦祥 (nec Regan, 1908), 2002: 351 ~ 352, 图 163 (东海外海和南海海外)。

2.2 计测结果

4 尾模式标本各项测量数据列于表 2。包括新种在内的 4 种宽鳃鮫鰩头体各部位长度与体长和头长之比列于表 3 (除新种外, 本属其他 3 种宽鳃鮫鰩的计测数据参照 Caruso & Bullis, 1976)。

背鳍 II (II), 9 ~ 10; 臀鳍 6 ~ 7; 胸鳍 18 ~ 19。其余计测如下: 隐埋于后头部皮褶内的背鳍第 3 棘

1 材料和方法

1.1 材料

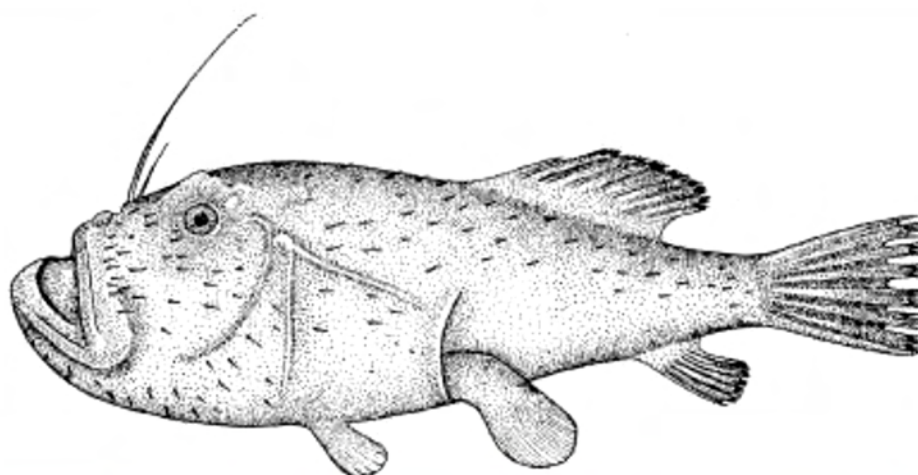
研究使用标本 4 尾, 于 1980 ~ 1982 年分别在东海和南海采到, 水深 655 ~ 979 m。标本存放于东海水产研究所 (EFRI) 和南海水产研究所 (SFRI) (表 1)。

和第 4 棘, 分别为体长的 5.2 % ~ 9.9 % 和 4.3 % ~ 9.2 %, 分别为背鳍第 1 棘长的 15 % ~ 17 % 和 12 % ~ 25 %; 背鳍第 2 棘长为第 1 棘长 33 % ~ 50 %。眼径为头长 10.8 % ~ 16.9 %, 为眼间距 26.5 % ~ 57.0 %。眼间距为头长 29.6 % ~ 43.0 %。

2.3 描述

体前部粗壮, 向后渐细。尾部稍侧扁, 腹面较平坦。头大, 隆起, 略平扁, 头宽小于头长。吻颇宽, 稍小于吻长。口大, 下颌突出, 后端伸达眼前缘下方。鼻囊较小, 每侧 1 个, 距前颌骨缝合处较距眼为近, 其长约为眼径 1/4 ~ 1/5; 前后鼻孔分别开孔于鼻囊的前端和后端。眼中大, 位于头部上侧位。眼间距较宽, 中间稍凹。眼前方和第 1 背鳍棘两侧的额骨嵴光滑; 眼上方的后额骨棘突较粗大, 眼后方具 2 较钝的碟耳骨棘; 上耳骨棘、间鳃盖骨棘和翼耳骨棘低而圆; 无肩棘。齿尖锐, 上下颌齿各 2 行: 前颌骨齿直立, 每侧外行齿 25 枚, 大小不等, 内行齿 6 ~ 8 枚, 近缝合处 1 齿较大, 呈犬牙状; 下颌齿后倾, 每侧外行齿 9 ~ 12 枚, 内行齿 10 ~ 13 枚, 较大; 犁骨齿每侧 4 ~ 5 枚, 犬牙状, 侧方 1 齿最大; 腭骨齿每侧 6 ~ 7 枚, 排成 1 行, 小于犁骨齿。鳃孔宽大, 部分伸达胸鳍基外侧的前方和上方, 部分伸达胸鳍基内侧的下方。鳃盖骨柔软, 为皮膜所盖。鳃 2 个, 鳃丝较发达, 无鳃耙。假鳃很长。肛门较大, 位于臀鳍起点前方。

头和体裸露无鳞, 具许多细长皮瓣, 在下颌腹面、头背和头侧及尾柄两侧者较发达。



1



2

图 1~2 朱氏宽鳃鲛, 新种 *Sladenia zhui* sp. nov.

1. 标本编号 (No.) E-0709, 体长 (SL) 500 mm 2. 标本编号 (No.) SFRI-D-1537, 体长 (SL) 300 mm

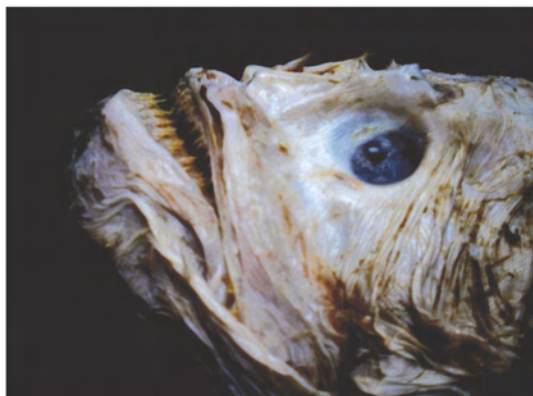


图 3 朱氏宽鳃鲛, 新种 *Sladenia zhui* sp. nov., 头部 (head), 标本编号 (No.) SFRI-D-1537

第 1 背鳍具 4 鳍棘, 前 2 棘丝状, 紧靠, 位于吻背中央的担鳍骨上; 后 2 棘隐于后头部的皮褶内, 在第 2 背鳍起点稍前方的表皮上各有 1 个小开口。第 2 背鳍起点距吻端与距尾端约相等或略近尾端, 中部鳍条较长。臀鳍起点始于第 2 背鳍第 8 鳍条下方, 低于第 2 背鳍。腹鳍喉位, 较短小。胸鳍长臂状。尾鳍后端近截形, 中部 6 鳍条分支。

头和体棕褐色, 无斑纹。腹面浅褐色。各鳍端部黑褐色。口腔和鳃腔灰白色。腹膜黑色。

2.4 鉴别

新种与同属其他 3 种的主要鉴别特征是背鳍具 4 棘, 其中后两棘隐埋于皮褶内; 吻较宽; 头部棘粗壮而钝; 体无斑纹。

表 2 朱氏宽鳃鲛 4 尾模式标本的测量数据
Table 2. Counts and measurements for four specimens of *Sladenia zhui* sp. nov.

性状 Characters	正模 Holotype EFRI-E-0709	副模 Paratypes		
		EFRI-E-0708	SFRI-D-1537	SOU-D-2381
背鳍 D. (dorsal fin)	II (II), 10 (1)	II (II), 9 (1)	II (II), 9 (1)	II (II), 9 (1)
臀鳍 A. (anal fin)	7	6	6	7
胸鳍 P. (pectoral fin)	18	18	18	19
腹鳍 V. (ventral fin)	I-5	I-5	I-5	I-5
尾鳍 C. (caudal fin)	8	8	8	8
全长 TL (total length) (mm)	635	650	375	276
体长 SL (standard length)	500	525	300	210
头宽 HW (head width)	128	121	60	45
头高 HD (head depth)	153.5	168	107	70
头长 HL (head length)	199	128	120	79.5
吻长 SNL (snout length)	92	96	59	36
吻宽 SNW (snout width)	62	64	35	27.5
眼径 Eye diameter	22.7	23.6	18	13.4
眼间距 Interorbital	85.5	70.5	37	23.5
上颌长 Length of upper jaw	130	134.2	79	56
下颌长 L. of lower jaw	197.4	203.2	115.3	74.5
第 1 背鳍棘长 L. of 1 st D. spine	184	215	110.5	73.5
第 2 背鳍棘长 L. of 2 nd D. spine	53.2	78	51.4	42.5
第 3 背鳍棘长 L. of 3 rd D. spine	32.5	39	29.7	11
第 4 背鳍棘长 L. of 4 th D. spine	21.5	30	27.7	10.1
背鳍基长 L. of base of D. fin	104	121.8	69	51.2
最长背鳍条 Longest D. ray	99	96	67.5	51.2
吻端与第 2 背鳍起点间距 Distance *	325	325	186.8	129.5
臀鳍基长 Length of base of	46.1	44.4	35	22
最长臀鳍条 Longest A. ray	74	70	48.7	34.8
胸鳍条长 Length of P. ray	67	77	55	41
尾鳍条长 Length of C. ray	130	125	75	66
尾柄长 Length of C. peduncle	52	57	76.4	35
尾柄高 Depth of C. peduncle	52.5	58.5	35	28.5

* Distance between the tip of snout and the origin of second dorsal fin.

2.5 讨论

4 尾中国标本曾先后被鉴定为褐色宽鳃鲛 *Sladenia remiger* Smith et Radcliffe (倪勇, 1988) 和伽氏高体鲛 (= 伽氏宽鳃鲛) *Sladenia gadinieri* Regan (苏锦祥, 2002)。其实, 这 4 尾标本与上述两种的区别较大 (检索表)。因此 2000 年我们认为这 4 尾中国标本是 1 新种, 同时将原始文稿和图寄给美国新奥尔良 Tulane 大学教授、深海鲛鱼类研究专家 J. H. Caruso 博士, 他也认为这是 1 个新种。宽鳃鲛属 *Sladenia* 4 种鱼检索表如下。

宽鳃鲛属种的检索表

- 1 (4) 第 1 背鳍具 3 棘, 第 3 背鳍棘隐埋于后头部皮下
- 2 (3) 第 3 背鳍棘深埋于皮下组织, 不包于皮褶内; 头部各棘突低小而圆; 吻较短, 为头长 47.5 % ~ 57.1 %; 体黑褐色, 头、体背面和侧面、下颌前部、背鳍和尾鳍基部、胸鳍和假鳃的背面, 具许多不

- 规则白色虫纹状斑纹 (西大西洋, 加勒比海, 2 尾, 体长 146.2 ~ 397.0 mm, 水深 850 ~ 1 200 m) 沙氏宽鳃鲛 *Sladenia shaeferi* Caruso et Bullis (1976)
- 3 (2) 第 3 背鳍棘隐于宽松的皮褶内; 额棘和碟耳骨棘尖而扩大; 吻较长, 为头长 74.1 %; 体灰褐色, 无虫纹状斑纹 (西南太平洋, 印度尼西亚, 西里伯斯, 托米尼, “Tomini” 湾 (0°21'N, 121°34'E; 水深 1 294 m), 1 尾, 体长 92.3 mm) 褐色宽鳃鲛 *Sladenia remiger* Smith et Radcliffe (1912)
- 4 (1) 第 1 背鳍具 4 棘, 第 3、4 背鳍棘隐埋于后头部皮褶内
- 5 (6) 头部棘低而尖, 大小相似; 吻较窄, 吻宽为体长 8.8 %, 为头长 21.3 %; 体暗灰色, 具不规则浅色虫纹状斑纹 (印度洋查戈斯群岛 “Chagos” 萨洛蒙 “Solomon” 岛, 1 尾, 体长 351 mm, 水深 900 m) 伽氏宽鳃鲛 *Sladenia gadinieri* Regan (1908)
- 6 (5) 头部棘粗壮而钝, 大小不一; 吻较宽, 吻宽为体长 11.7 % ~ 13.1 %, 为头长 29.2 % ~ 34.6 %; 体均一棕褐色, 无虫纹状斑纹 (西太平洋, 东海和南海, 4 尾, 体长 210 ~ 525 mm, 水深 655 ~ 979 m) 朱氏宽鳃鲛, 新种 *Sladenia zhui* sp. nov.

表3 4种宽鳃鲛属鱼类的测量数据
Table 3. Counts and measurements in percent of SL and HL for four species in *Sladenia*.

性状 Character	朱氏宽鳃鲛, 新种 <i>S. zhui</i> sp. nov.	伽氏宽鳃鲛 <i>S. gardineri</i> *	褐色宽鳃鲛 <i>S. remiger</i> *	沙氏宽鳃鲛 <i>S. shaeferi</i> *
背鳍 D. (Dorsal fin)	IV-9-10	IV-9	III-9	III-8-9
臀鳍 A. (Anal fin)	6~7	6	7	6
胸鳍 P. (Pectoral fin)	18-19	18	19	18
腹鳍 V. (Ventral fin)	I-5	I-5	I-5	I-5
尾鳍为体长% C. (Caudal fin % of SL)	8	8	8	8
头长 HL (head length)	37.9~41.5	41	27.6	32.7~34.8
头宽 HW (head width)	20.0~25.6	26.4	26.7	20.0~25.0
头高 HD (head depth)	30.7~35.7	33	28.8	31.5~28.3
S 吻宽 NW (snout width)	11.7~13.1	8.8	7.8	7.8~7.2
吻长 SNL (snout length)	17.1~19.7	19.1	20.5	18.7~16.5
第1背鳍棘长 (length of 1 st D. spine)	35.0~41.0	31.5	28.5	38.4~13.5
第2背鳍棘长为头长% (length of 2 nd D. spine % of HL)	10.6~20.2	10.4	-	6.9~12.9
头宽 HW (head width)	50.0~64.4	63.8	96.4	61.5~71.7
吻宽 SNW (snout width)	29.2~34.6	21.3	28.2	20.7~23.8
吻长 SNL (snout length)	44.0~49.2	46.1	74.1	47.5~57.1

* From Caruso and Bullis (1976).

新种与同分布于西太平洋的褐色宽鳃鲛 *S. remiger* Smith *et* Radcliffe 的主要区别: 1) 第1背鳍具4棘, 后2棘隐于后头部皮褶内 (后者具3棘, 第3棘隐于后头部皮下); 2) 第1背鳍第2棘长为第1棘长1/3~1/2 (依据模式种图示, 后者约相等); 3) 头部棘粗壮而钝 (后者额棘和碟耳骨棘尖而扩大); 4) 头较窄、较长: 头宽为头长50.0%~64.4% (后者为96.4%); 头长为体长37.9%~41.5% (后者为27.6%); 5) 吻较宽, 吻宽为体长11.7%~13.1% (后者为7.8%)。

新种与同具4背鳍棘的伽氏宽鳃鲛 *S. gardineri* Regan 的主要区别是: 1) 头部棘粗壮而钝, 大小不一 (后者棘低而尖, 大小相似); 2) 吻较宽, 吻宽为体长11.7%~13.1%, 为头长29.2%~34.6% (后者分别为8.8%和21.3%); 3) 体棕褐色, 无虫纹状斑纹 (后者体暗灰色, 具不规则虫纹状斑纹); 4) 分布于西太平洋深海 (后者分布于印度洋深海)。

词源: 新种种名以朱元鼎教授姓氏命名, 以表示对上海海洋大学前校长和东海水产研究所前所长朱元鼎教授在中国水产教育和水产研究, 特别是对鱼类分类学研究做出杰出贡献的深深敬意。

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